(64 000/48 000)*576 = 768 bit at 48 kHz sampling frequency. This means that there is a maximum deviation (short time buffer) of 7 680 - 4*768 = 4 608 bits is allowed at 64 kbits/s. The actual deviation is equal to the number of bytes denoted by the main_data_begin offset pointer. The actual maximum deviation is 2**9 * 8 bit = 4 096 bits. For intermediate bitrates the delay and buffer length can be calculated accordingly. The exchange of buffer between the left and right channel in a stereo bitstream is allowed without restrictions. Because of the constraint on the buffer size main_data_begin is always set to 0 in the case of bitrate_index==14, i.e. data rate 320 kbits/s per stereo signal. In this case all data are allocated between adjacent header words.

At sampling frequencies lower than 48 kHz the buffer should be constrained such that the same physical buffer size is sufficient as the one calculated for the 48 kHz case above.

2.4.3.4.5 Scalefactors

The scalefactors are decoded according to the slen1 and slen2 which themselves are determined from the values of scalefac_compress. The decoded values can be used as entries into a table or used to calculate the factors for each scalefactor band directly. When decoding the second granule, the scfsi has to be considered. For the bands in which the corresponding scfsi is set to 1, the scalefactors of the first granule are also used for the second granule, therefore they are not transmitted for the second granule.

The number of bits used to encode scalefactors is called part2_length, and is calculated as follows.

For block_type == 0, 1, or 3 (long blocks):

$$\text{part2\_length} = 11 * \text{slen1} + 10 * \text{slen2}.$$

For block_type==2 (short blocks) and mixed_block_flag == 0:

$$\text{part2\_length} = 18 * \text{slen1} + 18 * \text{slen2}.$$

For block_type==2 (short blocks) and mixed_block_flag == 1:

$$\text{part2\_length} = 17 * \text{slen1} + 18 * \text{slen2}.$$

These formulas are valid if gr==0 or if gr==1 and scfsi[ch][scfsi_band]==0 for all scfsi_bands, i.e. scalefactor selection information is not used.

2.4.3.4.6 Huffman decoding

All necessary information including the table which realizes the Huffman code tree can be generated from the tables in table B.7. First the big_values data are decoded, using the tables with the number table_select[gr][ch][region]. The frequency lines in region 0, region 1 and region 2 are Huffman decoded in pairs until big_values number of line-pairs have been decoded. The remaining Huffmancodebits are decoded using the table according to count1table_select[gr][ch]. Decoding is done until all Huffman code bits have been decoded or until quantized values representing 576 frequency lines have been decoded, whichever comes first. If there are more Huffman code bits than necessary to decode 576 values they are regarded as stuffing bits and discarded. The variable count1 is implicitely derived as the number of quadruples of decoded values using count1table_select.

2.4.3.4.7 Requantizer

The nonuniform quantizer uses a power law. For each output value, "is", from the Huffman decoder, "$|is|^{4/3}$" is calculated. This can be done either by table lookup or by explicit calculation.

2.4.3.4.7.1 Formula for requantization and all scaling

One complete formula describes all the processing from the Huffman decoded values to the input of the synthesis filterbank. All necessary scaling factors are contained within this formula. The output data are reconstructed from requantized samples. Global gain and subblock gain values affect all values within one time window (in the case of block_type==2). Scalefactors and preflag further adjust the gain within each scalefactor band. An illustration can be found in figure A.8.

The following is the requantization equation for short windows. The Huffman decoded value at buffer index i is called is_i, the input to the synthesis filterbank at index i is called xr_i:

$$xr_i = \text{sign}(is_i) * |is_i|^{\frac{4}{3}} * 2^{\frac{1}{4}(\text{global\_gain}[gr] - 210 - 8*\text{subblock\_gain}[\text{window}][gr])} * 2^{-(\text{scalefac\_multiplier} * \text{scalefac\_s}[gr][ch][sfb][\text{window}])}$$

For long blocks, the formula is:

$$xr_i = \text{sign}(is_i) * |is_i|^{\frac{4}{3}} * 2^{\frac{1}{4}(\text{global\_gain}[gr] - 210)} * 2^{-(\text{scalefac\_multiplier} * (\text{scalefac\_l}[sfb][ch][gr] + \text{preflag}[gr] * \text{pretab}[sfb]))}$$

Pretab[sfb] is a value given in the preemphasis table B.6. The constant 210 in this formula is needed to scale the output appropriately. It is a system constant. The synthesis filterbank is assumed to be implemented according to the formulas below. The range of the output values of the decoder (PCM samples) is between - 1,0 and + 1,0.

2.4.3.4.8 Reordering

If short blocks are used (block_type==2), the rescaled data xr[scf_band][window][freq_line] (as described in huffmancodebits() in 2.4.1.7) shall be reordered in subband order, xr[subband[window][freq_line], prior to the IMDCT operation.

2.4.3.4.9 Stereo Processing

After requantization, the reconstructed values are processed for MS or intensity stereo modes or both, before going to the synthesis filterbank. In MS_stereo mode, both channels of a granule must have the same block_type.

2.4.3.4.9.1 MS_stereo mode

This mode switch (found in the header: mode_extension) allows switching from "independent stereo" to MS_stereo. If MS_stereo is enabled but intensity stereo is not enabled the entire spectrum is decoded in MS_stereo. If both MS_Stereo and intensity stereo are enabled, the upper bound of the scalefactor bands decoded in MS_stereo is derived from the "zero_part" of the difference (right) channel. In this case the scalefactor band in which the last non-zero (right channel) frequency line occurs is the last scalefactor band to which the MS_stereo equations apply. Above this bound intensity stereo may be applied if enabled in the header. The "zero_part" of the difference channel is the part of the spectrum from "bigvalues * 2 + count1 * 4" (see 2.4.2.7) to the Nyquist rate.

2.4.3.4.9.2 MS matrix

In MS stereo mode the values of the normalized middle/side channels M_i/S_i are transmitted instead of the left/right channel values L_i/R_i. Thus L_i/R_i are reconstructed using

$$L_i = \frac{M_i + S_i}{\sqrt{2}} \text{ and } R_i = \frac{M_i - S_i}{\sqrt{2}}.$$

The values M_i are transmitted in the left, values S_i are transmitted in the right channel.

If window switching occurs, then the M and S channels must switch synchronously.

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2.4.3.4.9.3 Intensity stereo mode

This mode switch (found in the header: mode_extension) allows switching from 'normal stereo' to intensity stereo. In Layer III, intenisty stereo is not done using a pair of scalefactor s as in Layers I and II, but by specifying the magnitude (via the scalefactors of the right channel as normal) and a stereo position $is\_pos_{sb}[sfb]$. $is\_pos_{sb}[sfb]$ is transmitted instead of scalefactors for the right channels. The stereo position is used to derive the left and right channel signals according to the formulas below. The lower bound of the scalefactor bands decoded in intensity stereo is derived from the "zero_part" of the right

channel. Above this bound decoding of intensity stereo is applied using the scalefactors of the right channel as intensity stereo positions. An intensity stereo position of 7 in one scalefactor band indicates that this scalefactor band is not decoded as intensity stereo.

```
Scalefactor bands :
|         |         |         |         |         |         |         |         |         | . . .         |     |
|<--- nonzero_part of spectrum (right chan) --->|<----- zero_part of spectrum ------>|
|<------- m/s or l/r stereo coded part ---------->|<- intensity stereo coded part ->|
```

For each scalefactor band (sb) coded in intensity stereo, the following steps are executed:

1) the intensity stereo position is_pos_{sb} is read from the scalefactor of the right channel.

2) if (is_pos_{sb} == 7) do not perform the following steps (illegal is_pos).

3) $is\_ratio = \tan\left(is\_pos_{sb} * \frac{\pi}{12}\right)$.

4) $L_i := L_i * \frac{is\_ratio}{1 + is\_ratio}$ for all indices i within the actual scalefactor band sb.

5) $R_i := L_i * \frac{1}{1 + is\_ratio}$ for all indices i within the actual scalefactor band sb.

2.4.3.4.10 Synthesis filterbank

Figure A.4. shows a block diagram including the synthesis filterbank. The frequency lines are preprocessed by the "alias reduction" scheme (see the block diagrams in in figure A.5 and in table B.9. for the coefficients) and fed into the IMDCT matrix, each 18 into one transform block. The first half of the output values are added to the stored overlap values from the last block. These values are new output values and are input values for the polyphase filterbank. The second half of the output values is stored for overlap with the next data granule. For every second subband of the polyphase filterbank every second input value is multiplied by -1 to correct for the frequency inversion of the polyphase filterbank.

2.4.3.4.10.1 Alias reduction

For long block_type granules (block_type != 2) the input to the synthesis filterbank is processed for alias reduction before processing by the IMDCT. The following pseudo code describes the alias reduction computation:

```
for (sb=1; sb<32; sb++)
     for (i=0; i<8; i++) {
          xar[18*sb-1-i] = xr[18*sb-1-i]Cs[i] - xr[18*sb+i]Ca[i]
          xar[18*sb+i] = xr[18*sb+i]Cs[i] + xr[18*sb-1-i]Ca[i]
     }
```

The indices of arrays xar[] and xr[] label the frequency lines in a granule, arranged in order of lowest frequency to highest frequency, with zero being the index of the lowest frequency line, and 575 being the index of the highest. The coefficients: Cs[i] and Ca[i] can be found in table B.9. Figures A.5 and A.6 illustrate the alias reduction computation.

Alias reduction is not applied for granules with block_type == 2 (short block).

2.4.3.4.10.2 IMDCT

In the following, n is the number of windowed samples (for short blocks n is 12, for long blocks n is 36). In the case of a block of type "short", each of the three short blocks is transformed separately. n/2 values X_k are transformed to n values x_i. The analytical expression of the IMDCT is:

$$x_i = \sum_{k=0}^{\frac{n}{2}-1} X_k \cos\left(\frac{\pi}{2n}\left(2i + 1 + \frac{n}{2}\right)(2k+1)\right) \quad \text{for i = 0 to n - 1}$$

2.4.3.4.10.3 Windowing

Depending on the block_type different shapes of windows are used.

a) *block_type=0 (normal window)*

$$z_i = x_i \sin\left(\frac{\pi}{36}\left(i+\frac{1}{2}\right)\right) \quad \text{for i = 0 to 35}$$

b) *block_type=1 (start block)*

$$z_i = \begin{cases} x_i \sin\left(\frac{\pi}{36}\left(i+\frac{1}{2}\right)\right) & \text{for i = 0 to 17} \\ x_i & \text{for i = 18 to 23} \\ x_i \sin\left(\frac{\pi}{12}\left(i-18+\frac{1}{2}\right)\right) & \text{for i = 24 to 29} \\ 0 & \text{for i = 30 to 35} \end{cases}$$

c) *block_type=3 (stop block)*

$$z_i = \begin{cases} 0 & \text{for i = 0 to 5} \\ x_i \sin\left(\frac{\pi}{12}\left(i-6+\frac{1}{2}\right)\right) & \text{for i = 6 to 11} \\ x_i & \text{for i = 12 to 17} \\ x_i \sin\left(\frac{\pi}{36}\left(i+\frac{1}{2}\right)\right) & \text{for i = 18 to 35} \end{cases}$$

d) *block_type=2 (short block)*

Each of the three short blocks is windowed separately.

$$y_i^{(j)} = x_i^{(j)} \sin\left(\frac{\pi}{12}\left(i+\frac{1}{2}\right)\right) \quad \text{for i = 0 to 11, j = 0 to 2}$$

The windowed short blocks must be overlapped and concatenated.

$$z_i = \begin{cases} 0 & \text{for i = 0 to 5} \\ y_{i-6}^{(1)} & \text{for i = 6 to 11} \\ y_{i-6}^{(1)} + y_{i-12}^{(2)} & \text{for i = 12 to 17} \\ y_{i-12}^{(2)} + y_{i-18}^{(3)} & \text{for i = 18 to 23} \\ y_{i-18}^{(3)} & \text{for i = 24 to 29} \\ 0 & \text{for i = 30 to 35} \end{cases}$$

2.4.3.4.10.4 Overlapping and adding with previous block

The first half of the block of 36 values is overlapped with the second half of the previous block. The second half of the actual block is stored to be used in the next block:

$$\begin{aligned} \text{result}_i &= z_i + s_i && \text{for i = 0 to 17} \\ s_i &= z_{i+18} && \text{for i = 0 to 17} \end{aligned}$$

2.4.3.4.10.5 Compensation for frequency inversion of polyphase filterbank

The output of the overlap add consists of 18 time samples for each of the 32 polyphase subbands. If the time samples are labeled 0 through 17, with 0 being the earliest time sample, and subbands are labeled 0 through 31, with 0 being the lowest subband, then every odd time sample of every odd subband is multiplied by -1 before processing by the polyphase filter bank.

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Annex A

(normative)

Diagrams

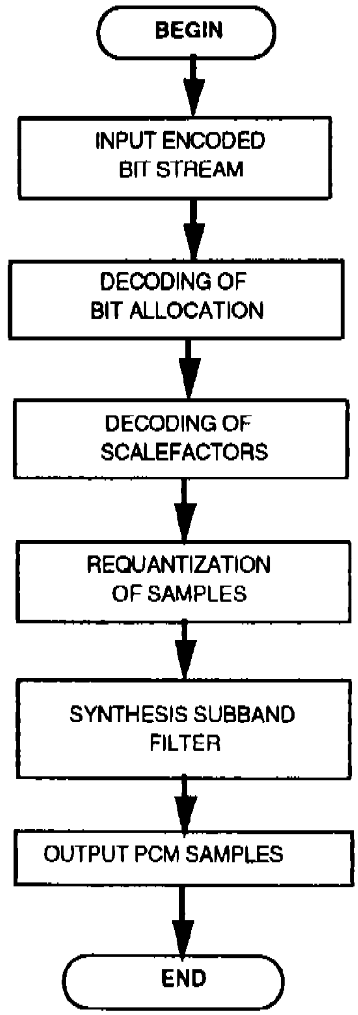


Figure A.1 -- Layer I and II decoder flow chart

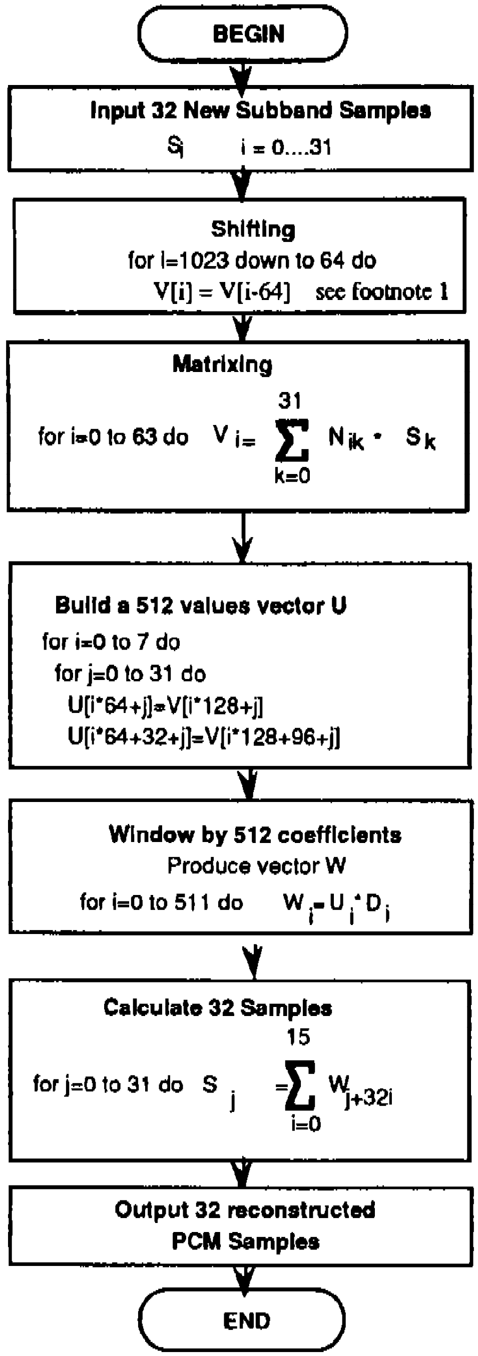


Figure A.2 -- Synthesis subband filter flow chart

---

1 V to be initialized with zeroes during startup.

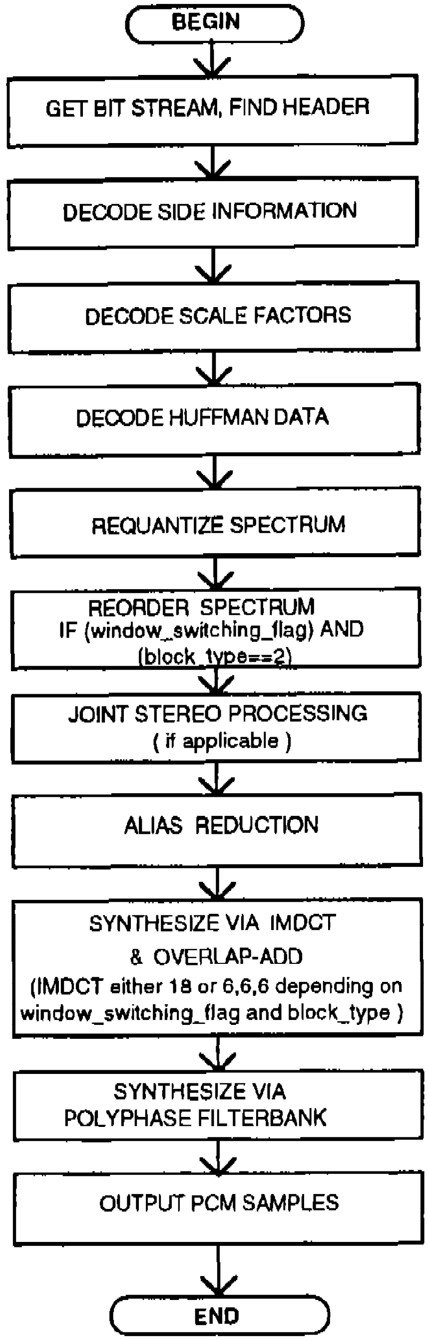


Figure A.3 -- Layer III decoder flow chart

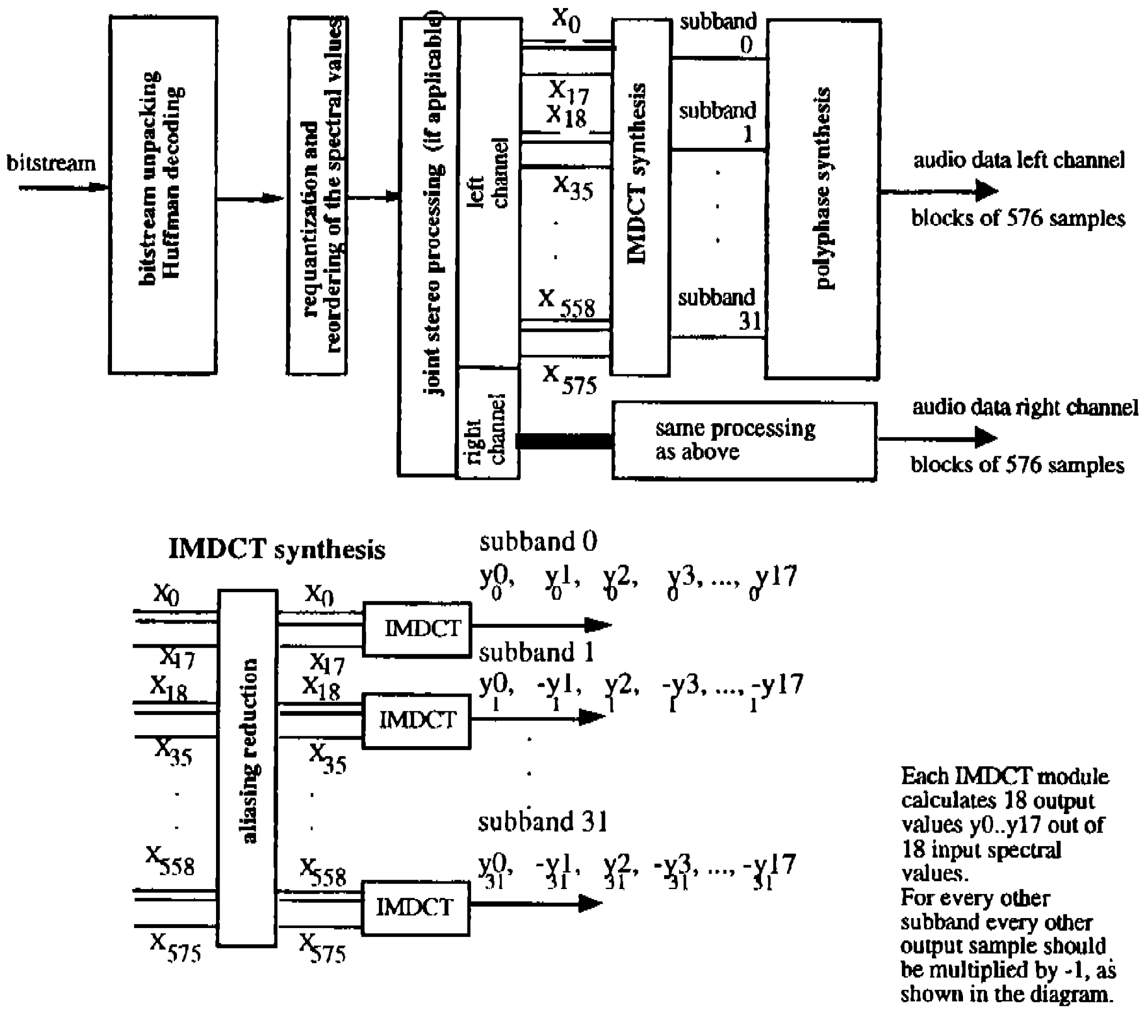


Figure A.4 -- Layer III decoder diagram

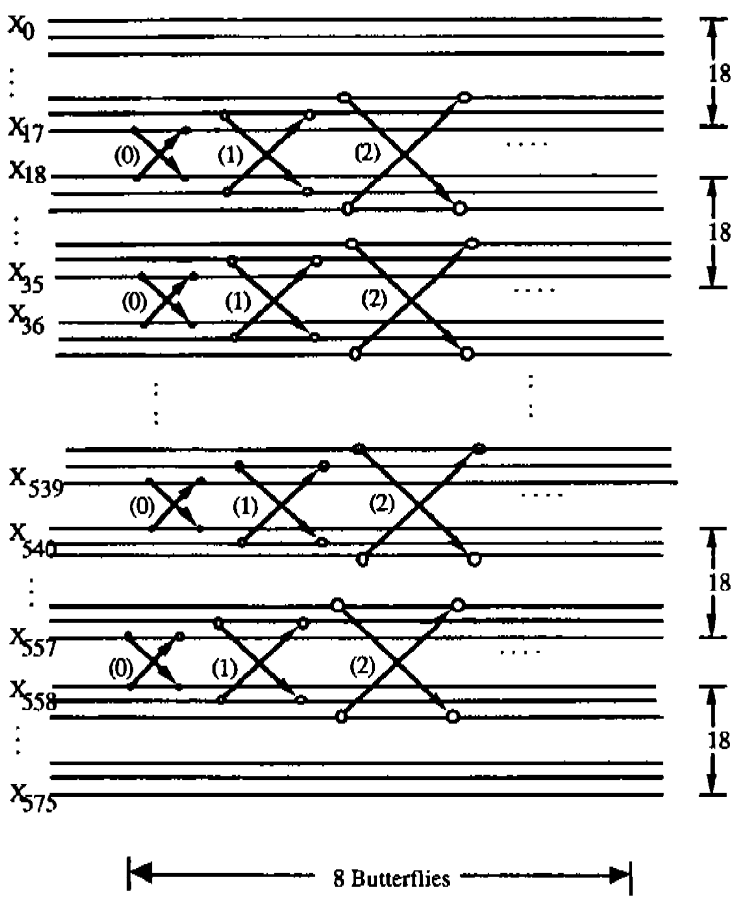


Figure A.5 -- Layer III aliasing reduction decoder diagram

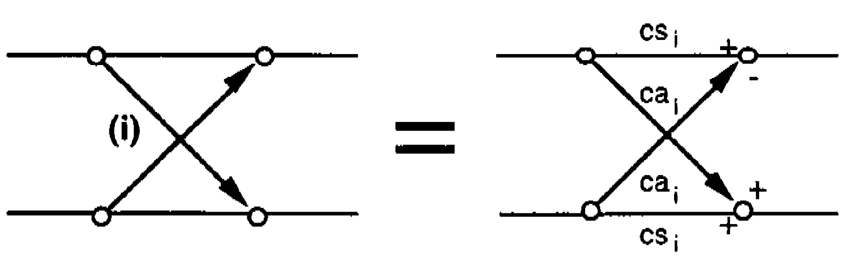


Figure A.6 -- Layer III aliasing-butterfly, decoder

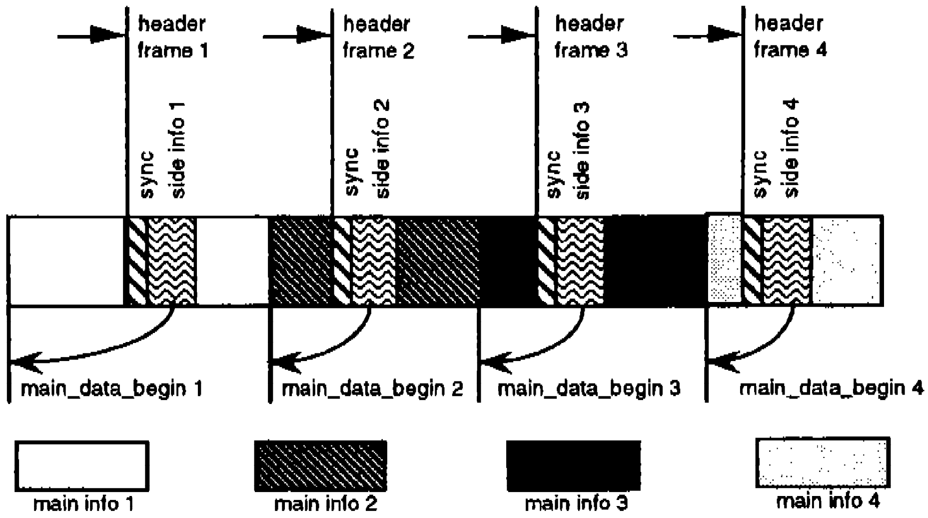
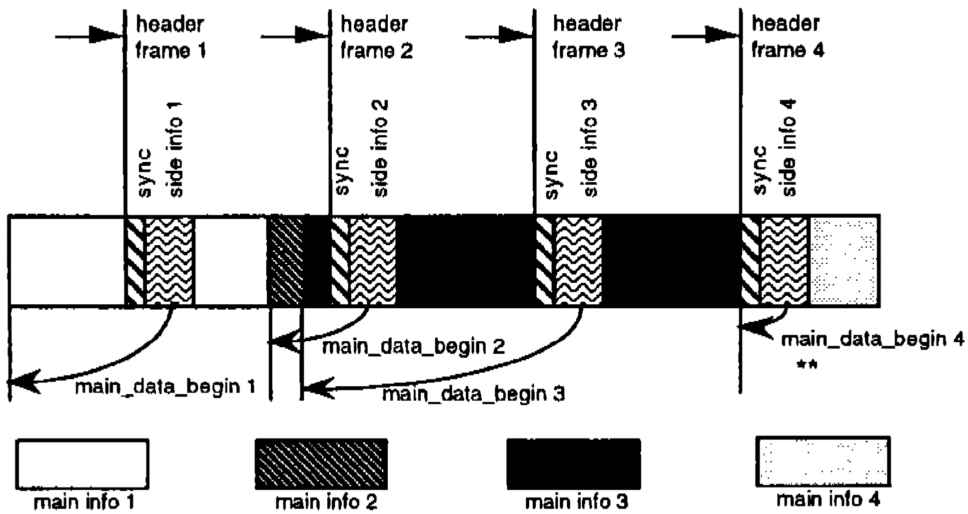


Figure A.7.a -- Layer III bitstream organization



**) main_data_begin 4 == 0 : This signifies that main data starts directly after the side Information for frame 4. This is the lower limit for main_data_begin; main_data cannot start later than this point. Note that data bytes used by "sync" and "side info" are not counted by the main_data_begin pointer.

Note: 'info' means information

Figure A.7.b -- Layer III bitstream organization with peak demand at main info 3 and small demand at main info 2.

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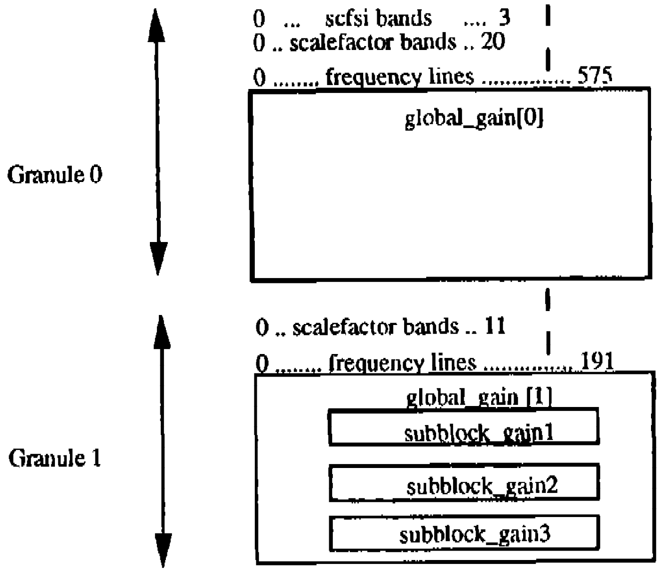

Figure A.8 -- Layer III illustration of granules for frame with block_type == 0 in first granule and block_type == 2 in second granule.

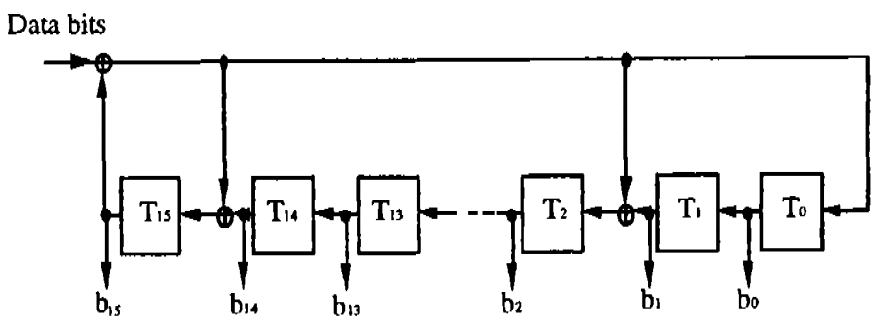

Figure A.9 -- CRC-check diagram

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Annex B

(normative)

Tables

Table B.1 -- Layer I,II scalefactors

index	scalefactor	index	scalefactor
0	2,00000000000000	32	0,00123039165029
1	1,58740105196820	33	0,00097656250000
2	1,25992104989487	34	0,00077509816991
3	1,00000000000000	35	0,00061519582514
4	0,79370052598410	36	0,00048828125000
5	0,62996052494744	37	0,00038754908495
6	0,50000000000000	38	0,00030759791257
7	0,39685026299205	39	0,00024414062500
8	0,31498026247372	40	0,00019377454248
9	0,25000000000000	41	0,00015379895629
10	0,19842513149602	42	0,00012207031250
11	0,15749013123686	43	0,00009688727124
12	0,12500000000000	44	0,00007689947814
13	0,09921256574801	45	0,00006103515625
14	0,07874506561843	46	0,00004844363562
15	0,06250000000000	47	0,00003844973907
16	0,04960628287401	48	0,00003051757813
17	0,03937253280921	49	0,00002422181781
18	0,03125000000000	50	0,00001922486954
19	0,02480314143700	51	0,00001525878906
20	0,01968626640461	52	0,00001211090890
21	0,01562500000000	53	0,00000961243477
22	0,01240157071850	54	0,00000762939453
23	0,00984313320230	55	0,00000605545445
24	0,00781250000000	56	0,00000480621738
25	0,00620078535925	57	0,00000381469727
26	0,00492156660115	58	0,00000302772723
27	0,00390625000000	59	0,00000240310869
28	0,00310039267963	60	0,00000190734863
29	0,00246078330058	61	0,00000151386361
30	0,00195312500000	62	0,00000120155435
31	0,00155019633981		

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Table B.2 -- Layer II bit allocation tables

Table B.2a -- Possible quantization per subband

Fs = 48 kHz Bit rates per channel = 56, 64, 80, 96, 112, 128, 160, 192 kbits/s, and free format.
Fs = 44,1 kHz Bit rates per channel = 56, 64, 80 kbits/s.
Fs = 32 kHz Bit rates per channel = 56, 64, 80 kbits/s.

		index															
sb	nbal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	4	-	3	7	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767	65535
1	4	-	3	7	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767	65535
2	4	-	3	7	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767	65535
3	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
4	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
5	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
6	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
7	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
8	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
9	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
10	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
11	3	-	3	5	7	9	15	31	65535								
12	3	-	3	5	7	9	15	31	65535								
13	3	-	3	5	7	9	15	31	65535								
14	3	-	3	5	7	9	15	31	65535								
15	3	-	3	5	7	9	15	31	65535								
16	3	-	3	5	7	9	15	31	65535								
17	3	-	3	5	7	9	15	31	65535								
18	3	-	3	5	7	9	15	31	65535								
19	3	-	3	5	7	9	15	31	65535								
20	3	-	3	5	7	9	15	31	65535								
21	3	-	3	5	7	9	15	31	65535								
22	3	-	3	5	7	9	15	31	65535								
23	2	-	3	5	65535												
24	2	-	3	5	65535												
25	2	-	3	5	65535												
26	2	-	3	5	65535												
27	0	-															
28	0	-															
29	0	-															
30	0	-															
31	0	-															

sblimit = 27
Sum of nbal = 88

Table B.2b -- Possible quantization per subband

Fs = 48 kHz ------------- not relevant -------------
Fs = 44,1 kHz Bitrates per channel = 96, 112, 128, 160, 192 kbits/s and free format
Fs = 32 kHz Bitrates per channel = 96, 112, 128, 160, 192 kbits/s and free format

index

sb	nbal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	4	-	3	7	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767	65535
1	4	-	3	7	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767	65535
2	4	-	3	7	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767	65535
3	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
4	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
5	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
6	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
7	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
8	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
9	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
10	4	-	3	5	7	9	15	31	63	127	255	511	1023	2047	4095	8191	65535
11	3	-	3	5	7	9	15	31	65535								
12	3	-	3	5	7	9	15	31	65535								
13	3	-	3	5	7	9	15	31	65535								
14	3	-	3	5	7	9	15	31	65535								
15	3	-	3	5	7	9	15	31	65535								
16	3	-	3	5	7	9	15	31	65535								
17	3	-	3	5	7	9	15	31	65535								
18	3	-	3	5	7	9	15	31	65535								
19	3	-	3	5	7	9	15	31	65535								
20	3	-	3	5	7	9	15	31	65535								
21	3	-	3	5	7	9	15	31	65535								
22	3	-	3	5	7	9	15	31	65535								
23	2	-	3	5	65535												
24	2	-	3	5	65535												
25	2	-	3	5	65535												
26	2	-	3	5	65535												
27	2	-	3	5	65535												
28	2	-	3	5	65535												
29	2	-	3	5	65535												
30	0	-															
31	0	-															

sblimit = 30
Sum of nbal = 94

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Table B.2c -- Possible quantization per subband

Fs = 48 kHz Bitrates per channel = 32, 48 kbits/s
Fs = 44,1 kHz Bitrates per channel = 32, 48 kbits/s
Fs = 32 kHz -------- not relevant --------

		index															
sb	nbal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	4	-	3	5	9	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767
1	4	-	3	5	9	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767
2	3	-	3	5	9	15	31	63	127								
3	3	-	3	5	9	15	31	63	127								
4	3	-	3	5	9	15	31	63	127								
5	3	-	3	5	9	15	31	63	127								
6	3	-	3	5	9	15	31	63	127								
7	3	-	3	5	9	15	31	63	127								
8	0	-															
9	0	-															
10	0	-															
11	0	-															
12	0	-															
13	0	-															
14	0	-															
15	0	-															
16	0	-															
17	0	-															
18	0	-															
19	0	-															
20	0	-															
21	0	-															
22	0	-															
23	0	-															
24	0	-															
25	0	-															
26	0	-															
27	0	-															
28	0	-															
29	0	-															
30	0	-															
31	0	-															

sblimit = 8
Sum of nbal = 26

Table B.2d. -- Possible quantization per subband

Fs = 48 kHz ------- not relevant -------
Fs = 44,1kHz ------ not relevant ------
Fs = 32 kHz Bitrates per channel = 32, 48 kbits/s.

		index															
sb	nbal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	4	-	3	5	9	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767
1	4	-	3	5	9	15	31	63	127	255	511	1023	2047	4095	8191	16383	32767
2	3	-	3	5	9	15	31	63	127								
3	3	-	3	5	9	15	31	63	127								
4	3	-	3	5	9	15	31	63	127								
5	3	-	3	5	9	15	31	63	127								
6	3	-	3	5	9	15	31	63	127								
7	3	-	3	5	9	15	31	63	127								
8	3	-	3	5	9	15	31	63	127								
9	3	-	3	5	9	15	31	63	127								
10	3	-	3	5	9	15	31	63	127								
11	3	-	3	5	9	15	31	63	127								
12	0	-															
13	0	-															
14	0	-															
15	0	-															
16	0	-															
17	0	-															
18	0	-															
19	0	-															
20	0	-															
21	0	-															
22	0	-															
23	0	-															
24	0	-															
25	0	-															
26	0	-															
27	0	-															
28	0	-															
29	0	-															
30	0	-															
31	0	-															

sblimit = 12
Sum of nbal = 38

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Table B.3 -- Coefficients D_i of the synthesis window

D[0]= 0,000000000	D[1]=-0,000015259	D[2]=-0,000015259	D[3]=-0,000015259
D[4]=-0,000015259	D[5]=-0,000015259	D[6]=-0,000015259	D[7]=-0,000030518
D[8]=-0,000030518	D[9]=-0,000030518	D[10]=-0,000030518	D[11]=-0,000045776
D[12]=-0,000045776	D[13]=-0,000061035	D[14]=-0,000061035	D[15]=-0,000076294
D[16]=-0,000076294	D[17]=-0,000091553	D[18]=-0,000106812	D[19]=-0,000106812
D[20]=-0,000122070	D[21]=-0,000137329	D[22]=-0,000152588	D[23]=-0,000167847
D[24]=-0,000198364	D[25]=-0,000213623	D[26]=-0,000244141	D[27]=-0,000259399
D[28]=-0,000289917	D[29]=-0,000320435	D[30]=-0,000366211	D[31]=-0,000396729
D[32]=-0,000442505	D[33]=-0,000473022	D[34]=-0,000534058	D[35]=-0,000579834
D[36]=-0,000625610	D[37]=-0,000686646	D[38]=-0,000747681	D[39]=-0,000808716
D[40]=-0,000885010	D[41]=-0,000961304	D[42]=-0,001037598	D[43]=-0,001113892
D[44]=-0,001205444	D[45]=-0,001296997	D[46]=-0,001388550	D[47]=-0,001480103
D[48]=-0,001586914	D[49]=-0,001693726	D[50]=-0,001785278	D[51]=-0,001907349
D[52]=-0,002014160	D[53]=-0,002120972	D[54]=-0,002243042	D[55]=-0,002349854
D[56]=-0,002456665	D[57]=-0,002578735	D[58]=-0,002685547	D[59]=-0,002792358
D[60]=-0,002899170	D[61]=-0,002990723	D[62]=-0,003082275	D[63]=-0,003173828
D[64]= 0,003250122	D[65]= 0,003326416	D[66]= 0,003387451	D[67]= 0,003433228
D[68]= 0,003463745	D[69]= 0,003479004	D[70]= 0,003479004	D[71]= 0,003463745
D[72]= 0,003417969	D[73]= 0,003372192	D[74]= 0,003280640	D[75]= 0,003173828
D[76]= 0,003051758	D[77]= 0,002883911	D[78]= 0,002700806	D[79]= 0,002487183
D[80]= 0,002227783	D[81]= 0,001937866	D[82]= 0,001617432	D[83]= 0,001266479
D[84]= 0,000869751	D[85]= 0,000442505	D[86]=-0,000030518	D[87]=-0,000549316
D[88]=-0,001098633	D[89]=-0,001693726	D[90]=-0,002334595	D[91]=-0,003005981
D[92]=-0,003723145	D[93]=-0,004486084	D[94]=-0,005294800	D[95]=-0,006118774
D[96]=-0,007003784	D[97]=-0,007919312	D[98]=-0,008865356	D[99]=-0,009841919
D[100]=-0,010848999	D[101]=-0,011886597	D[102]=-0,012939453	D[103]=-0,014022827
D[104]=-0,015121460	D[105]=-0,016235352	D[106]=-0,017349243	D[107]=-0,018463135
D[108]=-0,019577026	D[109]=-0,020690918	D[110]=-0,021789551	D[111]=-0,022857666
D[112]=-0,023910522	D[113]=-0,024932861	D[114]=-0,025909424	D[115]=-0,026840210
D[116]=-0,027725220	D[117]=-0,028533936	D[118]=-0,029281616	D[119]=-0,029937744
D[120]=-0,030532837	D[121]=-0,031005859	D[122]=-0,031387329	D[123]=-0,031661987
D[124]=-0,031814575	D[125]=-0,031845093	D[126]=-0,031738281	D[127]=-0,031478882
D[128]= 0,031082153	D[129]= 0,030517578	D[130]= 0,029785156	D[131]= 0,028884888
D[132]= 0,027801514	D[133]= 0,026535034	D[134]= 0,025085449	D[135]= 0,023422241
D[136]= 0,021575928	D[137]= 0,019531250	D[138]= 0,017257690	D[139]= 0,014801025
D[140]= 0,012115479	D[141]= 0,009231567	D[142]= 0,006134033	D[143]= 0,002822876
D[144]=-0,000686646	D[145]=-0,004394531	D[146]=-0,008316040	D[147]=-0,012420654
D[148]=-0,016708374	D[149]=-0,021179199	D[150]=-0,025817871	D[151]=-0,030609131
D[152]=-0,035552979	D[153]=-0,040634155	D[154]=-0,045837402	D[155]=-0,051132202
D[156]=-0,056533813	D[157]=-0,061996460	D[158]=-0,067520142	D[159]=-0,073059082
D[160]=-0,078628540	D[161]=-0,084182739	D[162]=-0,089706421	D[163]=-0,095169067
D[164]=-0,100540161	D[165]=-0,105819702	D[166]=-0,110946655	D[167]=-0,115921021
D[168]=-0,120697021	D[169]=-0,125259399	D[170]=-0,129562378	D[171]=-0,133590698
D[172]=-0,137298584	D[173]=-0,140670776	D[174]=-0,143676758	D[175]=-0,146255493
D[176]=-0,148422241	D[177]=-0,150115967	D[178]=-0,151306152	D[179]=-0,151962280
D[180]=-0,152069092	D[181]=-0,151596069	D[182]=-0,150497437	D[183]=-0,148773193
D[184]=-0,146362305	D[185]=-0,143264771	D[186]=-0,139450073	D[187]=-0,134887695
D[188]=-0,129577637	D[189]=-0,123474121	D[190]=-0,116577148	D[191]=-0,108856201
D[192]= 0,100311279	D[193]= 0,090927124	D[194]= 0,080688477	D[195]= 0,069595337
D[196]= 0,057617187	D[197]= 0,044784546	D[198]= 0,031082153	D[199]= 0,016510010
D[200]= 0,001068115	D[201]=-0,015228271	D[202]=-0,032379150	D[203]=-0,050354004
D[204]=-0,069168091	D[205]=-0,088775635	D[206]=-0,109161377	D[207]=-0,130310059
D[208]=-0,152206421	D[209]=-0,174789429	D[210]=-0,198059082	D[211]=-0,221984863
D[212]=-0,246505737	D[213]=-0,271591187	D[214]=-0,297210693	D[215]=-0,323318481
D[216]=-0,349868774	D[217]=-0,376800537	D[218]=-0,404083252	D[219]=-0,431655884
D[220]=-0,459472656	D[221]=-0,487472534	D[222]=-0,515609741	D[223]=-0,543823242

D[224]=-0,572036743	D[225]=-0,600219727	D[226]=-0,628295898	D[227]=-0,656219482
D[228]=-0,683914185	D[229]=-0,711318970	D[230]=-0,738372803	D[231]=-0,765029907
D[232]=-0,791213989	D[233]=-0,816864014	D[234]=-0,841949463	D[235]=-0,866363525
D[236]=-0,890090942	D[237]=-0,913055420	D[238]=-0,935195923	D[239]=-0,956481934
D[240]=-0,976852417	D[241]=-0,996246338	D[242]=-1,014617920	D[243]=-1,031936646
D[244]=-1,048156738	D[245]=-1,063217163	D[246]=-1,077117920	D[247]=-1,089782715
D[248]=-1,101211548	D[249]=-1,111373901	D[250]=-1,120223999	D[251]=-1,127746582
D[252]=-1,133926392	D[253]=-1,138763428	D[254]=-1,142211914	D[255]=-1,144287109
D[256]= 1,144989014	D[257]= 1,144287109	D[258]= 1,142211914	D[259]= 1,138763428
D[260]= 1,133926392	D[261]= 1,127746582	D[262]= 1,120223999	D[263]= 1,111373901
D[264]= 1,101211548	D[265]= 1,089782715	D[266]= 1,077117920	D[267]= 1,063217163
D[268]= 1,048156738	D[269]= 1,031936646	D[270]= 1,014617920	D[271]= 0,996246338
D[272]= 0,976852417	D[273]= 0,956481934	D[274]= 0,935195923	D[275]= 0,913055420
D[276]= 0,890090942	D[277]= 0,866363525	D[278]= 0,841949463	D[279]= 0,816864014
D[280]= 0,791213989	D[281]= 0,765029907	D[282]= 0,738372803	D[283]= 0,711318970
D[284]= 0,683914185	D[285]= 0,656219482	D[286]= 0,628295898	D[287]= 0,600219727
D[288]= 0,572036743	D[289]= 0,543823242	D[290]= 0,515609741	D[291]= 0,487472534
D[292]= 0,459472656	D[293]= 0,431655884	D[294]= 0,404083252	D[295]= 0,376800537
D[296]= 0,349868774	D[297]= 0,323318481	D[298]= 0,297210693	D[299]= 0,271591187
D[300]= 0,246505737	D[301]= 0,221984863	D[302]= 0,198059082	D[303]= 0,174789429
D[304]= 0,152206421	D[305]= 0,130310059	D[306]= 0,109161377	D[307]= 0,088775635
D[308]= 0,069168091	D[309]= 0,050354004	D[310]= 0,032379150	D[311]= 0,015228271
D[312]=-0,001068115	D[313]=-0,016510010	D[314]=-0,031082153	D[315]=-0,044784546
D[316]=-0,057617187	D[317]=-0,069595337	D[318]=-0,080688477	D[319]=-0,090927124
D[320]= 0,100311279	D[321]= 0,108856201	D[322]= 0,116577148	D[323]= 0,123474121
D[324]= 0,129577637	D[325]= 0,134887695	D[326]= 0,139450073	D[327]= 0,143264771
D[328]= 0,146362305	D[329]= 0,148773193	D[330]= 0,150497437	D[331]= 0,151596069
D[332]= 0,152069092	D[333]= 0,151962280	D[334]= 0,151306152	D[335]= 0,150115967
D[336]= 0,148422241	D[337]= 0,146255493	D[338]= 0,143676758	D[339]= 0,140670776
D[340]= 0,137298584	D[341]= 0,133590698	D[342]= 0,129562378	D[343]= 0,125259399
D[344]= 0,120697021	D[345]= 0,115921021	D[346]= 0,110946655	D[347]= 0,105819702
D[348]= 0,100540161	D[349]= 0,095169067	D[350]= 0,089706421	D[351]= 0,084182739
D[352]= 0,078628540	D[353]= 0,073059082	D[354]= 0,067520142	D[355]= 0,061996460
D[356]= 0,056533813	D[357]= 0,051132202	D[358]= 0,045837402	D[359]= 0,040634155
D[360]= 0,035552979	D[361]= 0,030609131	D[362]= 0,025817871	D[363]= 0,021179199
D[364]= 0,016708374	D[365]= 0,012420654	D[366]= 0,008316040	D[367]= 0,004394531
D[368]= 0,000686646	D[369]=-0,002822876	D[370]=-0,006134033	D[371]=-0,009231567
D[372]=-0,012115479	D[373]=-0,014801025	D[374]=-0,017257690	D[375]=-0,019531250
D[376]=-0,021575928	D[377]=-0,023422241	D[378]=-0,025085449	D[379]=-0,026535034
D[380]=-0,027801514	D[381]=-0,028884888	D[382]=-0,029785156	D[383]=-0,030517578
D[384]= 0,031082153	D[385]= 0,031478882	D[386]= 0,031738281	D[387]= 0,031845093
D[388]= 0,031814575	D[389]= 0,031661987	D[390]= 0,031387329	D[391]= 0,031005859
D[392]= 0,030532837	D[393]= 0,029937744	D[394]= 0,029281616	D[395]= 0,028533936
D[396]= 0,027725220	D[397]= 0,026840210	D[398]= 0,025909424	D[399]= 0,024932861
D[400]= 0,023910522	D[401]= 0,022857666	D[402]= 0,021789551	D[403]= 0,020690918
D[404]= 0,019577026	D[405]= 0,018463135	D[406]= 0,017349243	D[407]= 0,016235352
D[408]= 0,015121460	D[409]= 0,014022827	D[410]= 0,012939453	D[411]= 0,011886597
D[412]= 0,010848999	D[413]= 0,009841919	D[414]= 0,008865356	D[415]= 0,007919312
D[416]= 0,007003784	D[417]= 0,006118774	D[418]= 0,005294800	D[419]= 0,004486084
D[420]= 0,003723145	D[421]= 0,003005981	D[422]= 0,002334595	D[423]= 0,001693726
D[424]= 0,001098633	D[425]= 0,000549316	D[426]= 0,000030518	D[427]=-0,000442505
D[428]=-0,000869751	D[429]=-0,001266479	D[430]=-0,001617432	D[431]=-0,001937866
D[432]=-0,002227783	D[433]= 0,002487183	D[434]= 0,002700806	D[435]= 0,002883911
D[436]=-0,003051758	D[437]=-0,003173828	D[438]=-0,003280640	D[439]=-0,003372192
D[440]=-0,003417969	D[441]=-0,003463745	D[442]=-0,003479004	D[443]=-0,003479004
D[444]=-0,003463745	D[445]=-0,003433228	D[446]=-0,003387451	D[447]=-0,003326416
D[448]= 0,003250122	D[449]= 0,003173828	D[450]= 0,003082275	D[451]= 0,002990723
D[452]= 0,002899170	D[453]= 0,002792358	D[454]= 0,002685547	D[455]= 0,002578735

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D[456]= 0,002456665	D[457]= 0,002349854	D[458]= 0,002243042	D[459]= 0,002120972
D[460]= 0,002014160	D[461]= 0,001907349	D[462]= 0,001785278	D[463]= 0,001693726
D[464]= 0,001586914	D[465]= 0,001480103	D[466]= 0,001388550	D[467]= 0,001296997
D[468]= 0,001205444	D[469]= 0,001113892	D[470]= 0,001037598	D[471]= 0,000961304
D[472]= 0,000885010	D[473]= 0,000808716	D[474]= 0,000747681	D[475]= 0,000686646
D[476]= 0,000625610	D[477]= 0,000579834	D[478]= 0,000534058	D[479]= 0,000473022
D[480]= 0,000442505	D[481]= 0,000396729	D[482]= 0,000366211	D[483]= 0,000320435
D[484]= 0,000289917	D[485]= 0,000259399	D[486]= 0,000244141	D[487]= 0,000213623
D[488]= 0,000198364	D[489]= 0,000167847	D[490]= 0,000152588	D[491]= 0,000137329
D[492]= 0,000122070	D[493]= 0,000106812	D[494]= 0,000106812	D[495]= 0,000091553
D[496]= 0,000076294	D[497]= 0,000076294	D[498]= 0,000061035	D[499]= 0,000061035
D[500]= 0,000045776	D[501]= 0,000045776	D[502]= 0,000030518	D[503]= 0,000030518
D[504]= 0,000030518	D[505]= 0,000030518	D[506]= 0,000015259	D[507]= 0,000015259
D[508]= 0,000015259	D[509]= 0,000015259	D[510]= 0,000015259	D[511]= 0,000015259

Table B.4 -- Layer II classes of quantization

Number of steps	C	D	grouping	Samples per codeword	Bits per codeword
3	1,33333333333	0,50000000000	yes	3	5
5	1,60000000000	0,50000000000	yes	3	7
7	1,14285714286	0,25000000000	no	1	3
9	1,77777777777	0,50000000000	yes	3	10
15	1,06666666666	0,12500000000	no	1	4
31	1,03225806452	0,06250000000	no	1	5
63	1,01587301587	0,03125000000	no	1	6
127	1,00787401575	0,01562500000	no	1	7
255	1,00392156863	0,00781250000	no	1	8
511	1,00195694716	0,00390625000	no	1	9
1023	1,00097751711	0,00195312500	no	1	10
2047	1,00048851979	0,00097656250	no	1	11
4095	1,00024420024	0,00048828125	no	1	12
8191	1,00012208522	0,00024414063	no	1	13
16383	1,00006103888	0,00012207031	no	1	14
32767	1,00003051851	0,00006103516	no	1	15
65535	1,00001525902	0,00003051758	no	1	16

Table B.5 -- Number of protected audio_data bits

Layer	Protected Fields
I	bits 16...31 of header bit allocation
II	bits 16...31 of header bit allocation scalefactor selection information
III	bits 16...31 of header side information: - bits 0...135 of audio_data in single_channel mode - bits 0...255 of audio_data in other modes

Table B.6 -- Layer III preemphasis (pretab)

scalefactor band (cb)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
pretab[cb]	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	3	3	3	2

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